Conservation ROI Case Studies: The TNC-RFF Partnership

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Background

- Interest in measuring conservation's "return on investment"
  - Broad TNC leadership interest
  - The G&B Moore Foundation
  - The results-based management COP
- ROI is one face of RBM

Motivations

- Lessons from existing CROI studies
  - ROI is “better for biodiversity”
- TNC’s shifting mission and objectives
  - Objectives beyond biodiversity
    - Delivery of ecosystem services
    - People-oriented outcomes

What is ROI Analysis?

- Quantify conservation's "bang for buck"
  - Measure directly, or model & predict
- Costs of different interventions
  - Purchase, management, restoration
- Biophysical "lift" associated with each
  - Biodiversity +
  - Social benefits of biophysical improvements
- $$$s?
  - Sure, but not necessary

The Case Studies

- Phase 1
  - Deep dives, into TNC's highest profile projects
    - e.g., Great Bear Rainforest, Atlantic Forest water producer program, Savannah River hydro experiment
- Phase 2
  - Regional/country scale analysis to assist a TNC program
    - Mexico REDD investments

Big Part of Project

- Who wants ROI tools and case studies?
- How would they be used?

- Good news
  - Lots of demand
- Caution
  - Needs differ significantly depending on audience

TNC Partners & Audiences

- Central Science
- State program leaders
- Planning Evolution Team
- Project leaders
- Strategic Area leads
- Finance and deal makers
- Board of Directors and HQ leadership

Variations

- *Ex ante vs. Ex post*
  - *Ex ante* to plan & target
  - *Ex post* to evaluate performance
- Single investment *vs.* portfolio
  - Single to communicate, motivate, finance
  - Portfolio to plan & target

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Different methods, data, compromises, applications

The Phase 1 Case Studies

- Purpose
  - What is the “ROI story”?
  - What is the state of practice, methods and data?
  - Can we calculate ROI?
  - What gaps need to be filled?

Findings

- Good news
  - "Before project" and "with project" information for many biodiversity outcomes
  - Abundant ecosystem services "stories"
- Bad news
  - Weak/missing measurement or prediction of ecosystem services
  - Counterfactual analysis ("without project") generally absent (even for biodiversity)
  - Very little economic/social evaluation

EXAMPLE: Warm Springs Mountain Preserve

Project goals:

- Provide rare and threatened bird and mammal habitat
- Develop collaborations with federal land managers to achieve large-scale forest conservation

EXAMPLE: Warm Springs Mountain Preserve

- Monitoring and modeling activities to assess conservation outcomes
  - Effects of controlled burns on vegetation
  - Avian monitoring (w/ Forest Service) (will take years to detect effects)
  - Periodic additional species monitoring (partners)
  - Invasive species control (a small experiment)

EXAMPLE #2: Warm Springs Mountain Preserve

- Goals stated, but not quantified
  - Water quality protection (area includes tributaries to headwaters of the James River)
  - Preservation of scenic beauty
  - Provision of public recreational opportunities
- Likely additional services not quantified
  - Water flow regulation
  - Avoided carbon dioxide releases

Available biophysical data for project (monitoring/modeling)

	Pre-project	Ongoing	Predicted Counterfactual	
Vegetation	✔	✔	No*	New predictive tool by partner soon
Water Quality	No	No	No	Local groundwater monitoring possible
Carbon storage	No	No	No	
Water flows	No	No	No	
Avian biodiversity	✔	✔	No	
Fish biodiversity	No	✔	No	Limited sampling with partners
Other biodiversity	No	✔	No	Limited sampling with partners

Example: Savannah River Dam Reoperation and Floodplain Reconnection

Primary goals:

- Move towards re-establishing natural flow regimes and floodplain functions to increase key species pops.

- Produce co-benefits (hydropower, reduced drought risk, reduced flood risk)

US Army Corps of Engineers

Available biophysical & economic data for project (monitoring/modeling)

	Pre-project	With-project	Predicted Counterfactual	
Vegetation	✔	No	No	
- Carbon storage	No	No	No	Fairly easy to estimate
Water flows	✔	✔	✔	
- Hydropower	✔	✔	✔	USACE estimates
- Reservoir recreation	✔	✔	✔	
Fish biodiversity	✔	(+/-)	(+/-)	Well-studied
Fish harvests -commercial	✔	Some	Some	
-recreational	✔	Some	Some	

Example: Savannah River dam re-operation and floodplain reconnection (ex-ante)

ROI (annualized benefits and costs)

	Flood pool reduction:	LOW 25%	HIGH 50%
Benefits ($)	Commercial shad fishery	?	?
	Recreational shad fishery	96,639	564,230
	Sturgeon pop. Increase (annualized WTP)	19,179	35,052
	Reservoir recreation	2,003,064	9,230,914
	Hydropower	1,565,492	10,417,804
	Drought resistance, aquifer infiltration,…..	?	?
		3.68M	**20.25M**
Costs ($)	Flood damages/flood control projects		
	- structural (buyouts)	40,725	547,276
	- crops (1100/3200 ac for 25%/50% red.)	**TBD**	
	O&M	none	
	Study costs		
	- pre-feasibility analysis	330,000	
	- full feasibility analysis	?	
	Transaction costs (easements, buyouts, outreach)	?	
		370,725	**877,276**
ROI – preliminary/incomplete		**10:1**	**23:1**

The Case Studies

- Impressive stories
  - Biological planning
  - Multiple ES benefits very likely
  - Innovations re. quantification
  - Staff commitment to evaluation

Observations

- Project-specific data, methods, & studies are "buried"
  - Investigative effort needed to identify and collect ROI-relevant information about projects
- Big ROI gaps
  - Counterfactuals
  - Long-run monitoring resources
  - ES evaluation beyond stories
  - Social evaluation

Audiences

- Huge interest in, demand for ROI
  - From project staff level to Board of Directors
- Everyone wants it
  - Fast
  - Cheap
  - Good

Phase 2

- A portfolio planning application
- Three possibilities were discussed
  - Mexico (forest conservation, REDD)
  - Gulf of Mexico restoration
  - TNC's Global Strategies

Mexico Wins

- Mexico (forest conservation)
  - An application with conservation relevance to TNC
    - Complement the new $30M USAID REDD grant
    - Water funds siting?
    - National scale ecological planning?
  - Leverage data already available to us ★★★

Mexico Geographic Information System Data

Data	Description	Scale	Source
Land cover			
Land cover	~20 classes, from LANDSAT for 1979, 1993, 2000, 2007	1:250,000	SEMARNAT
Cost			
Annual opportunity cost	Potential gross revenues from agriculture (annual opportunity cost)		
Carbon stock	Aboveground forest biomass per hectare		
Biodiversity			
Species range	Known species ranges for different mammals, amphibians, reptiles, and birds		
Species threat assessment	Threat assessment of mammals, amphibians, reptiles, and birds		
Endemic species	Number of endemic species (mammals, amphibians, or reptiles)		
Institutional			
Protected areas	Location, type, date of creation	1:50,000 and	CONANP
Land tenure	~ 15 types 1984-1989	--	RAN
Regulatory	Forest agency administrative region	--	CONANP
Administrative	State and municipality boundaries	--	CONABIO
Geophysical			
Rainfall	Median annual	1:1,000,000	CONABIO
Elevation	--	--	
Slope	--	--	
Travel time	To nearest population and nearest city > 15K	10 m^2 pixels	
Soils	FAO type, texture, physical characteristics	1:1,000,000	
Socioeconomic			
Census data	1995, 2000, and 2005 county-level data on population, age, schooling, literacy, immigration, employment, ethnicity, income, etc.	--	

We Will Be Able To

- Quantify multiple investment outcomes
    - biodiversity, carbon, + water (?)
- Evaluate and communicate tradeoffs
- Evaluate and map threats (predicted baseline)
- Quantify social outcomes